

Facilities Quarterly

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY FACILITIES DEPARTMENT NEWSLETTER

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SUPERCOMPUTING CENTER TO BE A SHOWCASE

Berkeley Lab's newest national user facility, the National Energy Research Supercomputing Center (NERSC), is taking shape in the Building 50 complex. The center will house a Cray C90 supercomputer, related computer hardware, and the Energy Science Network (ESnet) operations center. Facilities is carrying out the engineering and construction work for the Center and associated office space for about 100 personnel.



Work begins under the raised floor in the future NERSC computer room.

Facilities Department participation in the project began in the proposal stage, when Director Shank called on Planning's Lisa Sullivan and Architectural Group Leader Danica Truchlikova to look at ways of siting NERSC at the Lab. Their contributions earned them Outstanding Performance Awards, and their basic recommendations are now becoming a reality.

Computing facilities will be located in two computer rooms, one on the first floors of 50A and 50B and the other on the second floor of 50B. Offices will occupy a horizontal slice of the 50 Complex, taking up the third floors of 50A and 50B and all of 50C and 50D. Offices for the new Computing directorate will be on the fourth floor of 50B. The Cray's power needs will be met by the excess capacity resulting from shutdown of the Bevatron.

The former ICSD computer room on the first floors of 50B and 50A is being expanded and refurbished to house the supercomputer and ESnet functions. The room's raised floor is needed for the Cray and wasn't

necessary for the ICSD computers, which have been moved to the new second-floor 50B computer room.

High on the list of improvements for the NERSC/ESNet computer room are mechanical heating, ventilating, and air conditioning (HVAC) systems that meet the facility's environmental requirements. Engineering of these systems is being carried out by Facilities Department mechanical engineers and designers.

"Based on program mission, we have designed mechanical systems that are flexible and reliable, including backup features that ensure dependable operation," says Rich Scudero, Mechanical Engineering supervisor. Temperature and humidity control will be achieved by self-contained air conditioning units that are floor-mounted within the computer room. These units can be located near hot spots or moved around, and more units can be added to meet future needs of the computer facility.

Ventilation air enters the computer room through a ceiling plenum and exits through a raised floor plenum. Two central fans, chilled water cooling coils, and bag filters provide treatment of the room air, which is then mixed with outside air and circulated back to the computer room. Perforations in ceiling and floor tiles allow cooling air access to computer room equipment. Existing ceiling-mounted fan coils and filters, which were old, difficult to service, and susceptible to water leaks, have been removed.

The Cray C90 computer has its own cooling system, including heat transfer by refrigerant to a condensing unit at a remote location. A new water-to-water heat exchanger transfers this heat to a rooftop cooling tower. With this arrangement, chilled water cooling was not necessary, chiller capacity was preserved for other uses, and energy consumption was reduced. To

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FREEZE PROTECTION

Winter is here, season of freezing temperatures and frozen water pipes.

Because freezing is infrequent and unpredictable in the Bay Area, it is all too easy to be caught off-guard, with costly consequences: burst pipes and components. To prevent this, Facilities Maintenance implements its Freeze Protection Program every November.

The program's objective is to minimize freeze damage at the Lab. "The idea is to be proactive, so that we're ready

when a freeze hits," says Facilities Operations and Maintenance Manager Don Weber.

The program provides several levels of readiness. The first level, implemented in November, involves routine measures to protect Berkeley Lab's many outdoor, above-surface water pipes. These measures include draining of irrigation pipes, wrapping pipes in burlap, and draining of pipe connected to anti-backflow devices. In addition, Plant Maintenance Technicians (PMTs) review the Freeze Protection Program

Manual. This thick book lists equipment and systems at risk—such as fire protection, domestic water, cooling water, safety showers and eyewash stations, compressed air systems, and HVAC systems—and gives procedures for freezing conditions. It also recommends some system modifications and upgrades.

The second level is implemented when the four-day forecast by Berkeley Lab's contract weather service predicts below-freezing temperatures. At this point, the PMTs review the Freeze Protection Program, make manpower provisions, check material and equipment stocks and procure needed material, and notify the Fire Department, Operations, and building managers.

When freezing conditions actually exist, the PMTs open specified indoor faucets and outdoor hose bibs to allow a small stream of water to flow, or "weep." Care is taken to prevent water from flowing across streets and walkways, and open faucets are tagged to prevent well-meaning passersby from closing them.

PMTs then begin monitoring systems, checking for proper flow and drainage at weeped systems, circulation of water in systems such as cooling towers, proper tagging, icing, exposed and unprotected systems, proper placement of insulation, and burst pipe and components. If freezing conditions persist for more than 12 hours, the PMTs take additional steps to protect specific piping and equipment, such as weeping exterior sprinkler system risers.

When freezing conditions pass, systems are returned to their Level 1 condition—ready for the next spate of frigid weather. Being ready for the next freeze is a good idea at home, too. A few simple precautions can save a hefty plumbing bill.



FROM THE FACILITIES MANAGER...

This year has seen a great many changes. We will miss our co-workers lost in the reduction-in-force, both on a personal basis and for the skills that they contributed. On the plus-side we won the NERSC competition, which will strengthen the Lab's future. Making room for NERSC resulted in approximately 600 moves, a test that our move coordination team passed with flying colors. The

introduction of the Life Cycle Asset Management Order defined a new way of working that requires us to find solutions instead of following directions; we have already shown that we can excel in that environment.

I wish to congratulate everyone for their contribution to the Self-Assessment Performance Measures. Our score this year was higher than last year despite higher performance goals, and Berkeley Lab Facilities scored the highest of the three UC Laboratories. I also want to express my appreciation to those Facilities personnel who kept the department running after the downsizing; when it appeared that we would be overwhelmed, you came through.

As you read this, we will have completed the holiday shutdown. Many of the Facilities staff worked over the holidays to perform repairs and maintenance operations that would have disrupted research if done at other times of the year. The NERSC team also worked over the shutdown to keep that project on schedule. We owe them our gratitude for their dedication to a BERKELEY LAB THAT WORKS!

On behalf of all us in Facilities, I wish you

A Happy New Year!

Bob Camper

FACILITIES DEPARTMENT

Facilities provides Berkeley Lab with a full range of architect and engineering, construction, and maintenance services for new facilities and modification and support of existing facilities.

Architect and engineering services include planning, programming, design, engineering, project management, and construction management for new facilities and modifications to existing facilities. Maintenance and construction functions include custodial, gardening, and lighting services; operation, service, and repairs or replacements to equipment and utility systems; and construction of modifications, alterations, and additions to buildings,

equipment, facilities, and utilities. Additional services include bus and fleet management, mail distribution, and the logistics functions of stores distribution and property disposal.

Ongoing Facilities activities include renewal and upgrade of site utility systems and building equipment; preparation of environmental planning studies; in-house energy management, space planning; and assurance of Laboratory compliance with appropriate facilities-related regulations and with University and DOE policies and procedures.

The Work Request Center expedites facility related work requests, answers questions, and provides support for facilities-related needs.

FOCUS ON SERVICE: VACUUM SYSTEM MAINTENANCE FILLS SERVICE VOID

It has been said that nature abhors vacuums; Plant Maintenance Technician Bill Chism works hard to maintain them.

Chism services, installs, designs and repairs vacuum systems hillwide. Some large programmatic facilities, such as the ALS, are staffed to maintain their own vacuum systems. Chism's focus is on smaller experiments and on systems belonging to user groups, a role for which his wide-ranging expertise makes him ideal. "Most vacuum systems on the Hill are one-of-a-kind systems designed by the experimenters themselves," says Chism, "There are many applications—from coaters for mirrors and microchips to lasers and beamlines—and just as many configurations." Chism's knowledge of configuration and component options is also helpful to

researchers designing new systems.

At present, Chism is working on five separate vacuum systems for the Superconducting Quantum Interference Devices (SQUID) Laboratory on the UC Berkeley Campus. This work includes upgrades to three small evaporators used in creating thin metal films, repair of pumps, and installation of pipes, automatic controls and safety interlocks.

Though Chism is kept busy by service calls, he would like to see more emphasis among user groups on preventive maintenance. "Too often," he says, "I only get a call from the user after a system has failed."

Although only required for DOE-owned equipment, Facilities' Preventive Maintenance System is

available to user groups. Chism has recently added a user group's 18 vacuum pumps on ALS beamline 9.0.2 to the Maintenance Database. He will service and inspect these pumps on a regular schedule.

Each equipment maintenance schedule can be tailored to the needs of the user group. The Maintenance Database contains maintenance schedules and repair histories for all DOE-owned equipment and that of participating non-DOE users. It enables Facilities Maintenance to provide timely, low-cost maintenance, preventing system failures and the resulting costs.

For more information on Facilities' vacuum system capabilities and maintenance programs please contact the Work Request Center.

COMPLIMENTS

- Ron Wood of the Move Coordination Team receives high praise for moving two Lab branch libraries into the main library. Lab Librarian Carol Backhus says, "Ron knew exactly what had to be done...It was a major move that had to be orchestrated in a few weeks and Ron did an excellent job."
- Robert G. Bergman writes to Paul Stagnaro of Stores, expressing his thanks for Paul's work in expediting delivery of gases to his campus research group. "Because getting the gases delivered ontime is critical to our research, we appreciate your courtesy and responsiveness to our needs."

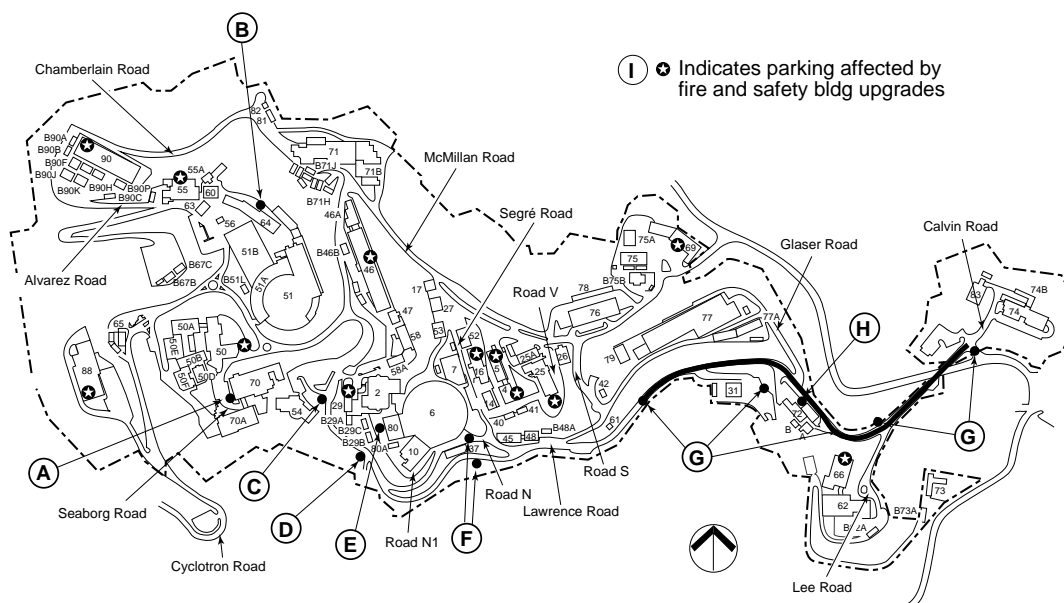
WORK REQUEST CENTER

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WRC welcomes questions or comments about the Facilities Quarterly.

CONSTRUCTION AND YOU

current construction projects affecting parking or vehicular or pedestrian circulation



Project Contacts. The name in parentheses after each project is the Project Manager (PM) or other person who is responsible for project oversight: coordinating all phases from design through construction; controlling cost, scope and schedule; and ensuring client satisfaction. This person will be happy to answer any questions about the project.

Bldg 70 Hazardous Materials Upgrades

A	Bldg 70 Hazardous Materials Upgrades		
	JAN	FEB	MAR
	Construction continues in Bldg 70. The trailer will be removed and parking restored in January. (Richard Stanton, x6221)		

Bldg 64 Renovation

B	Bldg 64 Renovation		
	JAN	FEB	MAR
	Construction continues. Parking spaces adjacent to the building will be reserved for construction operations through January. (John Musante, x5769)		

Bldg 54 Cafeteria Addition

C	Bldg 54 Cafeteria Addition		
	JAN	FEB	MAR
	Construction continues. Six parking spaces on the road to the left of the bus entrance to the Cafeteria parking lot are being used by the contractor. (Nathan Hong, x6088)		

Bldg 29 Parking Area

D	Bldg 29 Parking Area		
	JAN	FEB	MAR
	Site work continues. About 12 parking spaces between the Big C Substation and the Cafeteria are used for construction, and truck traffic from Bldg 74 vicinity to the fill area may slow traffic at times. (John Pickrell, x6710)		

Bldg 6/80 ALS Structural Biology Support

E	Bldg 6/80 ALS Structural Biology Support		
	JAN	FEB	MAR
	Construction continues. The 20 parking spaces on the west side of Bldg 80 will be used by the contractor as a laydown area for the duration of the project. (Joe Harkins, x7486)		

Bldg 6/37 LCW Piping

F	Bldg 6/37 LCW Piping		
	JAN	FEB	MAR
	Work includes a new concrete trench across the roadway between Bldg 37 and 6 and new piping from Bldg 37 to 6. There will be some interruption of traffic during construction of the trench and loss of parking for the subcontractor laydown area. (John Pickrell, x6710)		

East Canyon Electrical Safety

G	East Canyon Electrical Safety		
	JAN	FEB	MAR
	Construction continues. Underground duct banks are nearing completion. There may be short traffic delays at times. (John Pickrell, x6710)		

Bldg 72C Laboratory and Office Addition

H	Bldg 72C Laboratory and Office Addition		
	JAN	FEB	MAR
	The new structure will be located at the north end of Bldg 72C in an existing parking area. Site work will require relocation of an existing office trailer. A few parking spaces will be reserved for the contractor during construction. (Greg Raymond, x4284)		

Fire & Safety Upgrades

I	Fire & Safety Upgrades		
	JAN	FEB	MAR
	Construction continues in Bldgs 4, 5, 16, 25, 29, 46, 55, 66, and 90. Upgrades in Bldgs 50, 69, and 88 will begin in February. Parking spaces adjacent to the buildings may be reserved for construction operations. (Richard Stanton, x6221)		

ON THE DRAWING BOARD

projects in study or conceptual design

Blackberry Switching Station Replacement

The Blackberry Switching Station Replacement Project is the last major element in the master plan to rehabilitate the Lab's electrical power system and improve its reliability and safety. The project will upgrade the existing 12-kV power system and use circuit breakers provided in the FY87 improvements to Grizzly Substation. In addition to installing new 12-kV switchgear and cables, the project will eliminate the Big C switching station and switchgear at Bldg 51 and the Bldg 51 substation, and replace outdated 480 V load centers. (Richard Stanton, x6221)

Mechanical Equipment Replacement, Phase 1

This first project in a series will upgrade high-priority equipment in building and support mechanical systems throughout the Laboratory. Replacements in this project will include cooling towers, heating hot water boilers, air fans, steam boilers, air compressors, water chillers, emergency generators, and ancillary piping and control systems. (Pablo Orozco, x5820)

Radio Communications Upgrade

The proposed project will provide a complete emergency, security, and mobile maintenance radio system. Facilities improvements for the new radio system will include an unmanned modular radio communication shelter, free-standing radio tower, emergency generator, site utilities, and landscaping. (Chuck Taberski, x6076)

IN PROGRESS

funded projects

Bldg 2 Nanofabrication Facility

Construction is in progress in the NW quadrant of the first floor of Bldg 2. This work will relocate existing office space within Bldg 2 and prepare the nanowriter area for the installation of the environmental chamber and nanowriter. The nanowriter is scheduled to be installed in January 1996, once construction is completed. The laboratory will support research by the Center for X-Ray Optics. (Kirk Haley, x5973)

Building 72C Laboratory and Office Addition

Construction of an addition to Bldg 72C began in December and is scheduled for completion in July 1996. The addition provides three electron microscope laboratories on the first floor and ten supporting offices on the second floor, for a total area of 285 gross square meters (3,067 square feet). Direct access from the existing building is provided by corridor extensions on both levels, (Greg Raymond, x4284)

Sanitary Sewer Upgrade

Now in pre-design, this project will replace about 1,066 m of underground sanitary sewer lines. The system is over 50 years old, and degeneration has resulted from the past practice of discharging corrosive substances and from unstable geological conditions. Sewer breaks, offsets, obstructions, and undulations caused by ground movement and settling have resulted in excessive maintenance, sewer line cleaning problems, and possible soil contamination. (Pablo Orozco, x5820)

ALS Structural Biology Support Services

Construction has started with demolition and abatement. This project includes a build-out of the Bldg 80 high bay

area into a complete second floor and installation of about 900 m² of lab and office space in this area and the adjacent second floor of the ALS. Completion is expected in mid-1996. (Joe Harkins, x7486)

Bldg 84 Human Genome Laboratory

Mass excavation and construction of a large retaining wall continues. The Human Genome Lab will be a 3,800 m², 3-story, state-of-the-art molecular genetics research facility. The building will be adjacent to existing Bldgs 74 and 83. Project completion will be in late 1997. (Nathan Hong, x6088)

Energy Conservation Upgrades

Expansion of the Energy Monitoring and Control System (EMCS) continues. This system provides central monitoring and control of space-conditioning systems, including boilers, hot water pumps, air-handlers, and cooling towers. (Chuck Taberski, x6076)

Bldg 29 Parking Area

Sitework is in progress for the Bldg 29 parking area, which will provide about 42 parking spaces in the heavily populated central Lab area. This will also allow Lawrence Rd near Bldg 29 to revert to two-way traffic from the current single lane. The project includes site preparation, engineered fill placement, drainage, paving, lighting, guardrails, hydro-seeding, fence relocation, and striping. (John Pickrell, x6710)

Bldg 54 Cafeteria Addition

Construction is in progress for this 200 m² addition. This will provide conference and dining space with convenient catering and will serve as dining overflow for the cafeteria. Completion is expected in early 1996. (Nathan Hong, x6088)

SUPERCOMPUTING CENTER

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bolster system reliability, a backup cooling tower is proposed.

An automated monitoring and control system, designed by Dennis Kincy of IHEM, will monitor the environment in the NERSC/ESnet computer room. The system will include a graphic display for any required local monitoring, annunciation, and control. In addition, the system will be integrated with the labwide EMCS for increased reliability.

Electrical modifications were designed by Mahesh Gupta's Electrical Design Group. A new 1500 -kVA electrical substation will augment the existing 50B substation to supply NERSC's substantial power needs. Two new motor-generator sets will convert power from 480 V/60 Hz to the 225 V/400 Hz required by the Cray.

A new emergency power generator, dual 12-kV power feeds from Big C and Grizzly substations, new cabling, and sectionalizing of switches to Building 50B will enhance system reliability and safety. A special showpiece will be a map of the ESnet system, complete with indicator lamps displaying the status of different parts of this international computer network. The map and supercomputing area will be visible from a glass-enclosed visitor's gallery.

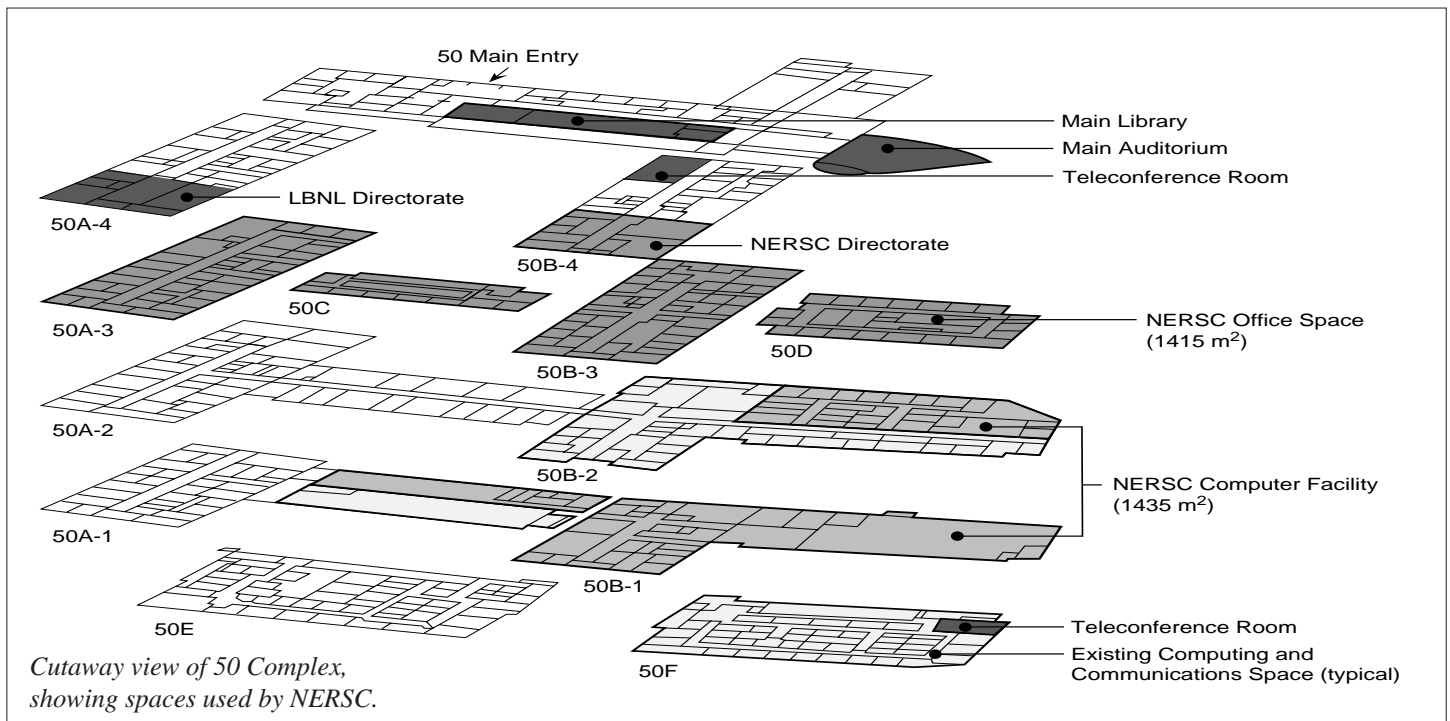
Facilities designers and construction crews are also at work in other areas of the 50 Complex, and ICSD computing equipment is up and running in the new second-floor computer room, which is being prepared for arrival of the Cray's six huge tape silos.

Small Projects Group Leader Bill Wu is handling preparation of office space in 50A, B, C, and D. This includes moving existing offices, cleanup and assembly of

cubicles, and construction of office suites on the fourth floor of 50B for the Computing directorate.

The NERSC Project draws on the full range of Facilities disciplines and crafts. The Facilities management team, headed by Project Manager Kirk Haley, includes Rich Scudero (Mechanical), Mahesh Gupta (Electrical), Fred Anglis (Civil), Doug Lockhart (IHEM), Superintendents Fred Bush and Don Beaton, and Danica Truchlikova (Architectural). According to Truchlikova team spirit is high. "We are modifying an existing building and providing upgraded services for a super-computer," she says. "It's a challenge, but it's been fun and exciting. There's lots of energy on the team—lots of enthusiasm."

That enthusiasm should reach a pinnacle when a crane lowers the 8-ton Cray into its new home and the job is done. As Lisa Sullivan says, "That's what Facilities is about: making it work—getting it done."



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